

Ravi Chugh

Ryerson 260, University of Chicago, 1100 E 58th Street, Chicago, IL 60637

☎ 773.702.6601 • ✉ rchugh@cs.uchicago.edu • 🌐 ravichugh.net

Research Interests

Programming Languages, Software Engineering, Human-Computer Interaction

Functional Programming, Program Synthesis and Repair, Refactoring, Structure Editors, Graphical User Interfaces

Education

University of California, San Diego, La Jolla, CA 2013

Ph.D., Computer Science

Dissertation Title: “Nested Refinement Types for JavaScript”

Dissertation Committee: Ranjit Jhala (Advisor), Samuel Buss, Alin Deutsch, Cormac Flanagan, Sorin Lerner

University of Pennsylvania, Philadelphia, PA 2007

M.S.E., B.S.E., Computer Science

Graduated *summa cum laude*.

Appointments

University of Chicago, Chicago, IL 2014 – present

Assistant Professor, Department of Computer Science

University of California, San Diego, La Jolla, CA 2013 – 2014

Postdoctoral Scholar

University of California, San Diego, La Jolla, CA 2007 – 2013

Graduate Student Researcher and Teaching Assistant

Mozilla Research, San Francisco, CA 2012

Research Intern

Microsoft Research, Redmond, WA 2009

Research Intern

Microsoft Corporation, Redmond, WA 2006

Software Design Engineer Intern

Microsoft Corporation, Redmond, WA 2005

Program Manager Intern

University of Pennsylvania, Philadelphia, PA 2004 – 2007

Teaching Assistant

Academic Honors

National Science Foundation 2017

CAREER Award

University of Chicago 2015

Neubauer Faculty Fellowship (undergraduate teaching award)

Grants

National Science Foundation 2018 – 2021

SHF: Small: Collaborative Research: Semantic Foundations for Hole-Driven Development (Award 1814900) ~\$247,000

Co-PI with Matthew Hammer (University of Colorado, Boulder)

National Science Foundation 2017 – 2022

CAREER: Direct Manipulation Programming Systems (Award 1651794) ~\$525,000

National Science Foundation	2016
<i>Midwest Programming Languages Summit 2016 (Award 1654961)</i>	\$5,000
University of Chicago	2015
<i>College Research Fellows Grant</i>	\$3,000

Drafts

Cyrus Omar, Ian Voysey, Ravi Chugh, and Matthew Hammer. **Live Functional Programming with Typed Holes**. July 2018.

Publications

2018

Mikaël Mayer, Viktor Kunčák, and Ravi Chugh. **Bidirectional Evaluation with Direct Manipulation**. In *Proceedings of the ACM on Programming Languages (PACMPL), Issue OOPSLA*, Boston, MA, November 2018. Conditionally accepted to appear after revision.

Brian Hempel, Justin Lubin, Grace Lu, and Ravi Chugh. **Deuce: A Lightweight User Interface for Structured Editing**. In *International Conference on Software Engineering (ICSE)*, May 2018.

2016

Brian Hempel and Ravi Chugh. **Semi-Automated SVG Programming via Direct Manipulation**. In *ACM Symposium on User Interface Software and Technology (UIST)*, Tokyo, Japan, October 2016. Featured in “Research for Practice: Programming by Examples,” *ACM Queue* (January/February 2017) and *Communications of the ACM* (July 2017).

Ravi Chugh, Brian Hempel, Mitchell Spradlin, and Jacob Albers. **Programming and Direct Manipulation, Together at Last**. In *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Santa Barbara, CA, June 2016.

Ravi Chugh. **Prodirect Manipulation: Bidirectional Programming for the Masses**. In *International Conference on Software Engineering Companion (ICSE-C), Visions of 2025 and Beyond Track (V2025)*, Austin, TX, May 2016.

2015

Ravi Chugh. **ISOlate: A Type System for Self-Recursion**. In *European Symposium on Programming Languages (ESOP)*, London, UK, April 2015.

2008 – 2012

Ravi Chugh, David Herman, and Ranjit Jhala. **Dependent Types for JavaScript**. In *ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)*, Tucson, AZ, October 2012.

Ravi Chugh, Patrick M. Rondon, and Ranjit Jhala. **Nested Refinements: A Logic for Duck Typing**. In *ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)*, Philadelphia, PA, January 2012.

Juan Chen, Ravi Chugh, and Nikhil Swamy. **Type-preserving Compilation for End-to-end Verification of Security Enforcement**. In *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Toronto, Canada, June 2010.

Nikhil Swamy, Juan Chen, and Ravi Chugh. **Enforcing Stateful Authorization and Information Flow Policies in Fine**. In *European Symposium on Programming (ESOP)*, Paphos, Cyprus, March 2010.

Ravi Chugh, Jeffrey A. Meister, Ranjit Jhala, and Sorin Lerner. **Staged Information Flow for JavaScript**. In *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Dublin, Ireland, June 2009.

Ravi Chugh, Jan W. Voung, Ranjit Jhala, and Sorin Lerner. **Dataflow Analysis for Concurrent Programs using Datarace Detection**. In *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Tucson, AZ, June 2008.

Workshop Papers

2017

Ravi Chugh. **Direct Manipulation Programming Systems (A Brief Introduction)**. White paper. In *ISAT/DARPA “Augmented Developers: Tools for Hybrid Man-Machine Software Engineering” Workshop*, Arlington, VA, February 2017.

2013

Ravi Chugh. **A Fix for Dynamic Scope**. In *ACM Workshop on ML*, Boston, MA, September 2013.

2012

Ravi Chugh, David Herman, and Ranjit Jhala. **Status Report: Dependent Types for JavaScript**. In *Workshop on Script to Program Evolution (STOP)*, Beijing, China, June 2012.

2011

Ravi Chugh, Ranjit Jhala, and Sorin Lerner. **Type Inference with Run-time Logs**. In *Workshop on Script to Program Evolution (STOP)*, Austin, TX, January 2011.

Presentations

Direct Manipulation Programming in Sketch-n-Sketch

ICFP Tutorials, St. Louis, MO (with Hempel, Lubin, and Mayer)

September 27, 2018 (upcoming)

Structured Editing for Elm* in Elm

elm-conf, St. Louis, MO

September 26, 2018 (upcoming)

Direct Manipulation Programming Systems

SPLASH-I, Vancouver, Canada

October 25, 2017

University of Wisconsin, Madison, WI

June 5, 2017

University of Maryland, College Park, MD

February 20, 2017

University of Washington, Seattle, WA

January 11, 2017

Interactive SVG Programming with Direct Manipulation

Strange Loop, St. Louis, MO

September 17, 2016

Prodirect Manipulation: Bidirectional Programming for the Masses

ICSE, Austin, TX

May 19, 2016

Program Synthesis for Direct Manipulation Interfaces

MIT, Cambridge, MA

March 1, 2016

Harvard University, Cambridge, MA

February 29, 2016

ECOOP PC Meeting, Brown University, Providence, RI

February 28, 2016

PADL (Invited Talk), St. Petersburg, FL

January 18, 2016

Midwest PL Summit, West Lafayette, IN

December 4, 2015

IsoLate: A Type System for Self-Recursion

ESOP, London, UK

April 14, 2015

Late Typing for Loosely Coupled Recursion

Dagstuhl, "Foundations of Scripting Languages," Wadern, Germany

June 30, 2014

Modern Type Systems for Dynamic Languages

Samsung Research, San Jose, CA

April 22, 2014

Purdue University, West Lafayette, IN

April 17, 2014

Swarthmore College, Swarthmore, PA

March 28, 2014

University of Chicago, Chicago, IL

March 14, 2014

A Fix for Dynamic Scope

OOPSLA PC Meeting, UCLA, Los Angeles, CA

May 14, 2014

ML Workshop, Boston, MA

September 22, 2013

Nested Refinement Types for JavaScript

Northeastern University, Boston, MA

September 30, 2013

University of California, San Diego, CA (Dissertation Defense)

September 3, 2013

University of California, San Diego, CA (Thesis Proposal)

November 16, 2011

Static Verification for Web Scripting Languages

University of Washington, Seattle, WA

April 18, 2013

Microsoft Research, Cambridge, UK	April 9, 2013
Microsoft Research, Redmond, WA	April 3, 2013
University of Texas, Austin, TX	March 19, 2013
IBM Research, Yorktown Heights, NY	March 14, 2013
University of Michigan, Ann Arbor, MI	February 28, 2013
Georgetown University, Washington, DC	February 25, 2013
Oregon State University, Corvallis, OR	February 13, 2013

Refinement Types for JavaScript Security

Brown University, Providence, RI	January 28, 2013
Rutgers University, New Brunswick, NJ	January 23, 2013

Dependent Types for JavaScript

HCSS, Annapolis, MD	May 7, 2013
SoCal, Riverside, CA	November 30, 2012
OOPSLA, Tucson, AZ	October 24, 2012
Dagstuhl, "Web Application Security," Wadern, Germany	October 2, 2012
JSTools, Beijing, China	June 13, 2012
STOP, Beijing, China	June 11, 2012

Nested Refinements: A Logic for Duck Typing

POPL, Philadelphia, PA	January 26, 2012
Dagstuhl, "Foundations of Scripting Languages," Wadern, Germany	January 4, 2012
SoCal, La Jolla, CA	December 3, 2011

Type Inference with Run-time Logs

STOP, Austin, TX	January 29, 2011
Kyoto University, Kyoto, Japan	January 17, 2011
SoCal, Los Angeles, CA	December 4, 2010

Fine + DCIL: End-to-end Verification of Security Enforcement

Microsoft Research, Redmond, WA	August 7, 2009
---------------------------------	----------------

Staged Information Flow for JavaScript

PLDI, Dublin, Ireland	June 16, 2009
-----------------------	---------------

Teaching Experience

University of Chicago

Honors Introduction to Computer Science I (undergraduate)	Fall 2017
Honors Introduction to Computer Science I (undergraduate)	Fall 2016
Honors Introduction to Computer Science I (undergraduate)	Fall 2015
Honors Introduction to Computer Science I (undergraduate)	Fall 2014
Functional Programming (undergraduate)	Spring 2017
Functional Programming (undergraduate)	Winter 2016
Functional Programming (undergraduate)	Winter 2015
Topics in Programming Languages: Direct Manipulation Programming (graduate)	Spring 2018
Topics in Programming Languages: Program Synthesis (graduate)	Spring 2017
Topics in Programming Languages: Program Synthesis (graduate)	Spring 2016
Topics in Programming Languages: Types and Contracts (graduate)	Spring 2015

University of California, San Diego

Programming Languages: Principles and Paradigms (undergraduate)	Winter 2014
---	-------------

University of Pennsylvania

Hardware and Software Algorithms (co-instructor, Summer Academy in Applied Science & Tech.)	July 2007
C# Programming (unofficial instructor)	Spring 2007

Students

Current Postdoctoral Advisees

Mikaël Mayer	2017 – present
Cyrus Omar	2017 – present

Current Ph.D. Advisees

Nick Collins	2018 – present
Brian Hempel	2015 – present

Current Undergraduate Advisees

Justin Lubin	2017 – present
--------------	----------------

Former Undergraduate Advisees

Jacob Albers		2015
Grace Lu	Deuce: Direct Manipulation Source Program Editor (BS Thesis)	2017
Izaak Meckler	Mote: Goal-Driven Development and Synthesis for Haskell (BS Thesis)	2015
Eri Rogers		2017
Amy Sitwala		2016
Mitchell Spradlin		2015
Bowen Wang	Predicting Haskell Type Signatures from Names (BS/MS Thesis)	2015 – 2018
Chris Winkler		2018
John Zhao		2016

Professional Service

Program Committees

Art, Science, and Engineering of Programming	<Programming> 2019
Workshop on Evaluation and Usability of Programming Languages and Tools	PLATEAU 2018
Live Programming Workshop (Co-organizer)	LIVE 2018
Programming Experience Workshop (PX)	PX/18
Live Programming Workshop	LIVE 2017
Programming Language Design and Implementation	PLDI 2017
Midwest PL Summit (Co-organizer)	MWPLS 2016
Trends in Functional Programming	TFP 2016
European Conference on Object-Oriented Programming	ECOOP 2016
Script to Program Evolution Workshop	STOP 2015
Principles of Programming Languages	POPL 2015
Object-Oriented Programming Languages, Systems, and Applications	OOPSLA 2014
Foundations of Object-Oriented Languages	FOOL 2013

External Review Committees

Programming Language Design and Implementation	PLDI 2016
Object-Oriented Programming Languages, Systems, and Applications	OOPSLA 2015
Programming Language Design and Implementation	PLDI 2014

Student Research Competition Committees

International Conference on Functional Programming (SRC Chair)	ICFP 2018
Principles of Programming Languages	POPL 2016
Programming Language Design and Implementation	PLDI 2015

Artifact Evaluation Committees

Programming Language Design and Implementation (AEC Co-chair)	PLDI 2019
Programming Language Design and Implementation (AEC Co-chair)	PLDI 2018
Programming Language Design and Implementation	PLDI 2014

External Reviews

User Interface Software and Technology	UIST 2018
Principles of Programming Languages	POPL 2016
Principles of Programming Languages	POPL 2014

Object-Oriented Programming Languages, Systems, and Applications	OOPSLA 2011
European Symposium on Programming	ESOP 2011
Compiler Construction	CC 2009

Journal Article Reviews

New Generation Computing	2015
Transactions on Programming Languages and Systems	TOPLAS 2013, 2014

Grant Proposal Panels and Reviews

National Science Foundation	2015, 2017, 2018
-----------------------------	------------------

Board Memberships

Elm Software Foundation	2017 – present
-------------------------	----------------

University Service

Doctoral Thesis Committees

Mikaël Mayer (EPFL)	Advisor: Viktor Kuncak	2017
Tanakorn Leesatapornwongsa	Advisor: Haryadi Gunawi	2017
Lamont Samuels	Advisor: John Reppy	2016

Masters Thesis Committees

Bowen Wang		2018
Junwen Yang	Advisor: Shan Lu	2018
Guangpu Li	Advisor: Shan Lu	2017
Joe Wingerter	Advisor: John Reppy	2017
Kavon Farvardin	Advisor: John Reppy	2017
Austin Byers	Advisor: Ari Feldman	2016
Tanakorn Leesatapornwongsa	Advisor: Haryadi Gunawi	2014

University Award Committees

Liew Family College Research Fellows	2017
--------------------------------------	------